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**UNITED STATES DISTRICT COURT OF CALIFORNIA
FOR THE NORTHERN DISTRICT OF CALIFORNIA**

PUREPREDICTIVE, INC, a Utah corporation

Plaintiff,

CASE NO.

H2O.AI, Inc., a Delaware corporation

COMPLAINT FOR PATENT INFRINGEMENT

DEMAND FOR JURY TRIAL

Defendant.

Plaintiff PUREPREDICTIVE, Inc. ("PPI") hereby complains of Defendant H2O.AI, Inc. ("H2O") and DOES I through X, inclusive, and alleges as follows:

PARTIES

1. Plaintiff PPI is a Utah corporation with its principal place of business in Utah.
2. On information and belief, H2O is a Delaware corporation with its principal place of business in Santa Clara County, California.
3. PPI is ignorant of the true names and capacities of Defendants sued herein as DOES I through X inclusive (“DOE Defendants”), and therefore sues the DOE Defendants by such fictitious names. PPI will amend this Complaint to allege their true names and capacities when ascertained. PPI is informed and believes and thereon alleges that each of the DOE

1 Defendants is responsible in some manner for the occurrences herein alleged, and that PPI's
 2 losses and damages as herein alleged were proximately caused by the misconduct of the DOE
 3 Defendants.

4 **JURISDICTION AND VENUE**

5 4. This is an action for patent infringement. This Court has subject matter
 6 jurisdiction under 28 U.S.C. § 1331 as the patent infringement claim arises under the patent
 7 laws of the United States, 35 U.S.C. § 271 *et seq.*

8 5. This Court has personal jurisdiction over H2O because H2O has continuous and
 9 systematic contacts with the State of California and does business in this District. For example,
 10 H2O maintains operations in Mountain View, California.

11 6. Venue is proper in this District under 28 U.S.C. § 1331 because i) H2O resides
 12 in this judicial district and, ii) on information and belief, H2O's acts of infringement took place
 13 and are taking place within this jurisdiction.

14 **FACTUAL BACKGROUND**

15 7. PPI is a technology-backed service company using artificial intelligence to
 16 orchestrate advanced predictive modeling exponentially increasing the insights that businesses
 17 gain from their data.

18 8. Through patented technology, PPI dramatically streamlines the process to
 19 model and deploy advanced predictive models allowing businesses to transform their data
 20 warehouses into repositories of revenue.

21 9. H2O is an open-source software service company that provides a machine
 22 learning platform that is integrated with applications and data products, and customer support
 23 offerings for the machine learning platform.

24 **The Patent-in-Suit**

25 10. PPI is the owner and assignee of several patents and pending patent applications
 26 relating to U.S. Patent No. 8,880,446.

27 11. On November 4, 2014, the United States Patent and Trademark Office duly and
 28 legally issued U.S. Patent No. 8,880,446 ("the '446 Patent"), entitled "PREDICTIVE

1 ANALYTICS FACTORY" to Richard W. Wellman and Kelly D. Phillipps. PPI is the owner of
2 the '446 Patent. A true and correct copy of the '446 Patent is attached hereto as Exhibit A.

3 12. The '446 Patent is valid and enforceable.

4 13. PPI provides services that use artificial intelligence to orchestrate advanced
5 predictive modeling in accordance with the principles described in the '446 Patent.

6 14. On May 24, 2017, PPI's representatives contacted H2O to inform it of the '446
7 Patent and PPI's belief that H2O's machine learning platform uses one or more apparatuses,
8 methods, program products, and systems covered by the '446 Patent.

9 **Infringement of the Patent-in-Suit**

10 15. On information and belief, H2O's development and distribution of its artificial
11 intelligence platform ("H2O with AutoML") infringes one or more claims of the '446 Patent.

12 16. Independent claim 1 of the '446 Patent is a representative claim of an apparatus
13 infringed by H2O with AutoML. Claim 1 recites the following elements:

14

15 An apparatus for a predictive analytics factory, the apparatus comprising:

16 a receiver module configured to receive training data for forming a predictive
17 ensemble customized for the training data;

18 a function generator module configured to pseudo-randomly generate a plurality
19 of learned functions based on the training data without prior knowledge
20 regarding suitability of the generated learned functions for the training
21 data;

22 a function evaluator module configured to perform an evaluation of the plurality
23 of learned functions using test data and to maintain evaluation metadata
24 for the plurality of learned functions, the evaluation metadata
25 comprising one or more of an indicator of a training data set used to
26 generate a learned function and an indicator of one or more decisions
27 made by a learned function during the evaluation; and

28

1 a predictive compiler module configured to form the predictive ensemble, the
2 predictive ensemble comprising a subset of multiple learned functions
3 from the plurality of learned functions, the multiple learned functions
4 selected and combined based on the evaluation metadata for the plurality
5 of learned functions, the predictive ensemble comprising a rule set
6 synthesized from the evaluation metadata to direct data through the
7 multiple learned functions such that different learned functions of the
8 ensemble process different subsets of the data based on the evaluation
9 metadata.

10 17. Independent claim 14 of the '446 Patent is a representative claim of method
11 infringed by H2O with AutoML. Claim 14 recites the following elements:

12

13 A method for a predictive analysis factory, the method comprising:
14 pseudo-randomly generating a plurality of learned functions based on training
15 data without prior knowledge regarding suitability of the generated
16 learned functions for the training data, the training data received for
17 forming a predictive ensemble customized for the training data;
18 evaluating the plurality of learned functions using test data to generate
19 evaluation metadata indicating an effectiveness of different learned
20 functions at making predictions based on different subsets of the test
21 data; and
22 forming the predictive ensemble comprising a subset of multiple learned
23 functions from the plurality of learned functions, the subset of multiple
24 learned functions selected and combined based on the evaluation
25 metadata, the predictive ensemble comprising a rule set synthesized
26 from the evaluation metadata to direct different subsets of the workload
27 data through different learned functions of the multiple learned functions
28 based on the evaluation metadata.

1 18. Independent claim 17 of the '446 Patent is a representative claim of a computer
2 program product infringed by H2O with AutoML. Claim 17 recites the following elements:

3
4 A computer program product comprising a non-transitory computer readable storage
5 medium storing computer usable program code executable to perform operations for a
6 predictive analysis factory, the operations comprising:

7 pseudo-randomly determining a plurality of learned functions using training
8 data without prior knowledge regarding suitability of the determined
9 learned functions for the training data, the training data comprising a
10 plurality of features, the training data received for forming a predictive
11 ensemble customized for the training data;

12 selecting a subset of the features of the training data based on evaluation
13 metadata generated for the plurality of learned functions, the evaluation
14 metadata comprising an effectiveness metric for a learned function; and
15 forming the predictive ensemble, the predictive ensemble comprising at least
16 two learned functions from the plurality of learned functions, the at least
17 two learned functions using the selected subset of features, the at least
18 two learned functions selected and combined based on the evaluation
19 metadata, the predictive ensemble comprising a rule set synthesized
20 from the evaluation metadata to direct data through the at least two
21 learned functions so that different learned functions process different
22 features of the selected subset of features.

23 19. Independent claim 23 of the '446 Patent is a representative claim of a predictive
24 analytics ensemble infringed by H2O with AutoML. Claim 23 recites the following elements:

25
26 A predictive analytics ensemble comprising:

27 multiple learned functions synthesized from a larger plurality of learned
28 functions, the multiple learned functions selected and combined based

1 on evaluation metadata for an evaluation of the larger plurality of
2 learned functions, wherein the larger plurality of learned functions are
3 generated pseudo-randomly from training data without prior knowledge
4 of a suitability of the larger plurality of learned functions for the training
5 data;

6 a metadata rule set synthesized from the evaluation metadata for the plurality of
7 learned functions for directing data through different learned functions
8 of the multiple learned functions to produce a result; and

9 an orchestration module configured to direct the data through the different
10 learned functions of the multiple learned functions based on the
11 synthesized metadata rule set to produce the result.

12 20. On information and belief, H2O with AutoML infringes Claims 1, 14, 17, and
13 23 of the '446 Patent.

14 21. H2O with AutoML is open source, and therefore the source code for the H2O
15 platform is publicly available from H2O's website via the GitHub version control repository.

16 22. H2O's website also includes links to documentation for H2O with AutoML
17 ("the documentation") including source code documentation, tutorials, videos, examples, and
18 presentations that discuss the design and implementation of H2O with AutoML, including how
19 machine learning ensembles are generated and used.

20 23. The documentation describes how training data is imported or uploaded to H2O
21 with AutoML.

22 24. The documentation also describes how different machine learning models are
23 selected and generated based on the training data.

24 25. H2O posted a slideshow ("the slideshow") for AutoML online on October 31,
25 2016, prepared by Raymond Peck, director of H2O's product engineering, which discloses that
26 the machine learning models in H2O with AutoML are selected and generated automatically
27 without determining whether the models are suitable for the training data.

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1 26. H2O also posted a video online (“the video”) on February 24, 2017, where Erin
2 Ledell, a statistician and machine learning scientist at H2O, discusses how AutoML will
3 automatically select machine learning models for a stacked machine learning ensemble without
4 requiring a data scientist to specify parameters, features, etc. for the machine learning models
5 as a function of the training data.

6 27. The source code for H2O with AutoML (version 3.02) (“the source code”)
7 includes a java file (AutoML.java) that includes java source code for automatically generating
8 a series of different machine learning models without receiving input from a user, such as a
9 data scientist, regarding parameters or other settings for generating the machine learning
10 models based on the training data.

11 28. The documentation also describes how the performance of each of the machine
12 learning models is evaluated using test data, and how the results of the evaluation of the
13 machine learning models are stored as metadata associated with the machine learning models.

14 29. According to the documentation, cross-validation and/or test data is used to
15 evaluate the performance of the machine learning models.

16 30. The documentation also describes how a stacked machine learning ensemble
17 that includes multiple machine learning models is generated using various machine learning
18 models that were trained and evaluated on the training and testing data.

19 31. The documentation also describes how machine learning models are selected for
20 inclusion in the stacked machine learning ensemble based on the evaluation metadata.

21 32. The slideshow also suggests that a stacked machine learning ensemble is
22 generated by automatically selecting machine learning models to include in the stacked
23 machine learning ensemble according to a rating or evaluation metadata associated with each
24 machine learning ensemble.

25 33. The source code also includes code for generating a stacked ensemble based on
26 the machine learning models that are automatically generated without receiving input from a
27 user.

28

34. The documentation also describes that a stacked machine learning ensemble is generated from multiple “base-learners.” The numbers, types, and combinations of “base-learners” that are included in a stacked machine learning ensemble are customized into a base learner library.

5 35. According to the slideshow, H2O with AutoML includes features for creating
6 composite machine learning models, selecting machine learning models based on the top N
7 machine learning models from a hyperparameter search, and generating stacked ensembles
8 using machine learning models based on the performance of the models, e.g., models with
9 uncorrelated results.

10 36. Given H2O's documentation, open source software, slideshow, and issue
11 tracking information, PPI has reason to believe that H2O with AutoML operates using Claims
12 1, 14, 17, and 23 of the '446 Patent.

FIRST CAUSE OF ACTION

14 | (Direct Infringement of U.S. Patent No. 8,880,446)

15 37. PPI repeats and incorporates by reference the allegations in paragraphs 1-36 of
16 the Complaint as if fully set forth herein.

17 38. H2O has infringed and continues to infringe, either literally or under the
18 doctrine of equivalents, one or more claims of the '446 Patent by developing and distributing
19 H2O with AutoML. H2O's activities constitute direct infringement under 35 U.S.C. § 271(a).
20 A representative claim chart detailing H2O's infringement of at least independent claims 1, 14,
21 17, and 23 of the '446 Patent is attached as Exhibit B.

22 39. On information and belief, H2O's infringement of the '446 Patent has been and
23 continues to be intentional, willful, and without regard to PPI's rights. PPI is informed and
24 believes, and on that basis alleges, that H2O's infringement of the '446 Patent is and has been
25 intentional, deliberate, and willful because it had knowledge of the '446 Patent through, if
26 nothing more, direct communication with PPI.

27 40. PPI has sustained damages as a direct and proximate result of H2O's
28 infringement of the '446 Patent.

1 41. PPI will suffer and is suffering irreparable harm from H2O's infringement of
2 the '446 Patent. PPI has no adequate remedy at law and is entitled to an injunction against
3 H2O's continuing infringement of the '446 Patent. Unless enjoined, H2O will continue its
4 infringing conduct.

SECOND CAUSE OF ACTION

(Induced Infringement of U.S. Patent No. 8,880,446)

7 42. PPI repeats and incorporates by reference the allegations in paragraphs 1-41 of
8 the Complaint as if fully set forth herein.

9 43. H2O has induced infringement and continues to induce infringement, either
10 literally or under the doctrine of equivalents, of one or more claims of the '446 Patent by
11 distributing, facilitating, directing, and encouraging H2O's users to download, install, and use
12 H2O with AutoML. H2O's activities constitute induced infringement under 35 U.S.C. §
13 271(b). H2O induces its users to infringe the claim elements of Claims 1, 14, 17, and 23 of the
14 '446 Patent, as outlined in the claim chart attached as Exhibit B, by providing tutorials and
15 trainings for using H2O with AutoML; by providing detailed documentation for downloading,
16 installing, and using H2O with AutoML; and by providing customer support services to
17 directly assist users in downloading, installing, and using H2O with AutoML.

18 44. On information and belief, H2O's induced infringement of the '446 Patent has
19 been and continues to be intentional, willful, and without regard to PPI's rights. PPI is
20 informed and believes, and on that basis alleges, that H2O's induced infringement of the '446
21 Patent is and has been intentional, deliberate, and willful because it had knowledge of the '446
22 Patent through, if nothing more, direct communication with PPI.

23 45. PPI has sustained damages as a direct and proximate result of H2O's induced
24 infringement of the '446 Patent.

25 46. PPI will suffer and is suffering irreparable harm from H2O's induced
26 infringement of the '446 Patent. PPI has no adequate remedy at law and is entitled to an
27 injunction against H2O's continuing induced infringement of the '446 Patent. Unless enjoined,
28 H2O will continue its infringing conduct.

PRAYER FOR RELIEF

WHEREFORE, PPI prays for relief as follows:

- A. A judgment that the '446 Patent is valid and enforceable;
- B. A judgment that H2O has infringed one or more claims of the '446 Patent;
- C. An order and judgment preliminarily and permanently enjoining H2O and its
s, directors, agents, servants, employees, affiliates, and all others acting in privity or in
t with them, from further acts of infringement of the '446 Patent;
- D. A judgment awarding PPI all damages adequate to compensate for H2O's
ement of the '446 Patent, and in no event less than a reasonable royalty for H2O's
ement, including all pre-judgment and post-judgment interest at the maximum rate
ted by law;
- E. A judgment awarding PPI all damages, including treble damages, based on any
ement found to be willful, pursuant to 35 U.S.C. § 284, together with pre-judgment
t;
- F. Actual damages suffered by PPI as a result of H2O's unlawful conduct, in an
t to be proven at trial, as well as pre-judgment interest as authorized by law;
- G. A judgment that this is an exceptional case and an award to PPI of its costs and
able attorneys' fees incurred in this action as provided by 35 U.S.C. § 285; and
- H. Such other relief as this Court deems just and proper.

JURY DEMAND

Pursuant to Rule 38 of the Federal Rules of Civil Procedure, PPI hereby demands trial by jury on all issues triable.

Dated: May 26, 2017

KUNZLER LAW GROUP, P.C.

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R. Jeremy Adamson
Attorneys for PUREPREDICTIVE, INC.